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Combining Administrative and Statistical Sources to Estimate Goods Sent Abroad for Processing in Italy

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Summary

The treatment of trade in goods and services in National Accounts and in Balance of Payments according to the new international standards is conceptually clear, while the practical implementation of the new definitions proves to be challenging. International merchandise trade statistics (IMTS) data, classified by Nature of the Transaction (NoT), do not always provide all the necessary information to estimate international processing services and imports and export of goods according to the change of ownership principle. Hence, it is strongly recommended to supplement IMTS data with information collected through business surveys and to reconcile the information coming from different sources. This paper describes both the data sources used and the procedure followed in Italy to estimate goods sent abroad for processing, focusing on the use of a new source of information, the Intra-Community trade in services data collected by the tax authority, available since 2010. The advantages of using this administrative source are twofold. First, it allows the direct estimation of processing services of Italian firms within the European Union. Second, through record linking with IMTS data, it makes it possible to implement the adjustments needed to derive trade in goods according to the ESA2010 and BPM6 definitions.

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I. Introduction

1.   According to the new accounting standards (ESA 2010 and BPM6) imports and exports of goods have to be registered only when a change of ownership occurs. This means that the value of goods sent abroad for processing, crossing the borders without a change of ownership, is not recorded, whilst their value was considered in ESA 95 registration principle. Such flows are now registered, on a net basis, as exports or imports of processing services.

2.   To implement the new definitions two steps are needed: a) an estimation of the value of processing services; b) an adjustment to International Merchandise Trade Statistics (IMTS) data to remove the flows of goods crossing the border for or after processing.

3.   The main statistical source to carry out those two operations is represented by IMTS data by nature of transaction (NoT). At the one-digit level NoT codes allow to differentiate between transactions involving a transfer of ownership, operations in view of a processing activity and operations following a processing activity. At the two-digit level the operations related to a processing activity are further broken down into: a) those where the good is sent abroad from the country of ownership and after processing returns to the country of ownership ("symmetric flows"); b) those where the good is sent from the country of ownership but after processing does not return to the country of ownership, or where the good is not sent from the country of ownership but after processing returns to the country of ownership ("asymmetric flows").

4.   In the case of symmetric flows, the availability of information on IMTS data at the two-digit level of the NoT codes would allow to approximate the processing service as the difference between the value of the good after and before processing[2] and to exclude these transactions from National Accounts (NA) and Balance of Payments (BP) trade in goods figures.

5.   On the contrary, asymmetric flows have to be recorded in trade in goods on NA/BP basis because a change of ownership occurs, even if the value of the flows needs to be adjusted for the value of the processing service incorporated in the value of the goods. Explicit guidance on the adjustment is given in the Eurostat Manual of Goods Sent Abroad for Processing[3] and in the UNECE guide to measuring global production[4]. Differently from symmetric flows, no information can be extracted from IMTS data to estimate the processing service.

6.   Collection of NoT codes is mandatory at the one-digit level within the Intrastat framework but not mandatory in Extrastat. The availability of NoT codes within the framework of Extrastat depends on whether or not the national Customs collect this

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[2] The value of the processing service is not necessarily the same as the difference between the two gross flows for different reasons. The product during the manufacturing process may change its value not only for the processing fee but also for the addition of further raw materials or intermediate products. Additionally, inconsistencies between the value of the good declared before and after processing and the real processing fee could occur.

[3] Eurostat (2014), Manual on goods sent abroad for processing, http://ec.europa.eu/eurostat-/documents/3859598-/5936933/KS-GQ-14-003-EN.PDF

[4] UNECE (2015), Guide to measuring global production, presented at the Conference of European Statisticians, Geneva 17-18 February 2015, http://www.unece.org/fileadmin/DAM/stats-/documents-/ece/ces-/bur/2015/February/16Add.1-Guide_to_Measuring_Global_Production.pdf.

information through the custom declaration. Where IMTS data are not available at the two-digit level of NoT codes, supplementary sources are needed.

II. Sources available in Italy for estimating goods sent abroad for processing

7. Istat collects NoT codes in Extrastat at the two-digit level from the customs declarations, but this information is not deemed to be reliable enough, and at the one-digit level in Intrastat. It follows that, for estimating goods for processing, the information coming from IMTS data at one-digit level of NoT codes has to be supplemented with other sources.

8. In Italy two supplementary sources have been used: a) administrative data on trade in services inside European Union (Intrastat Services, IS), available since 2010; b) the quantity of crude oil processed in Italian refineries on behalf of non-resident owners. Information derived from Structural Business Statistics has only been taken into account in specific cases, since it is not deemed to be reliable enough.

9. Following the Directive 2008/8/EC, as of January 2010 companies in Italy have to report to the tax authority information related to intra-community transactions of services performed or received. In order to apply the new directive, the Italian Revenue Agency decided to link the data collection on services to the survey on goods (Intrastat goods, IG): each company that has traded services with other EU companies must fill in a form similar to the IG one. As for the typology of services traded, information has to be provided according to the CPA 2008 classification at six-digit level: this information is very useful to correctly identify the kind of processing services in the context of the compilation of Supply and Use tables in NA and also to validate trade in goods recorded in IMTS by NoT code, as explained in the next section.

III. Combining IS and IG data to estimate trade in goods within European Union

10. IS data, besides allowing a direct estimation of the processing services inside EU, played a key role for the correction of Intrastat Goods (IG) data to evaluate trade in goods according to the change of ownership principle. In fact, exploiting the information derived from an integrated database obtained by linking IS and IG data at the company level, it is possible to validate or, if needed, modify the NoT codes reported in IG. Furthermore, it allows to adapt IG data to the new ESA/BP definitions at the micro level.

11. The observations coming from this integrated database are first analysed in order to separate consistent and inconsistent information, according to whether at the company level, joint signals in IS and in IG exist.

12. The group of observations with consistent information is further divided into two subgroups:

- The first (symmetric flows) contains all the companies that present joint signals of exports of processing services, imports of goods for processing and exports of goods after processing for inward processing and/or joint signals of imports of processing services, exports of goods for processing and imports of goods after processing for outward processing.

- The second subgroup (asymmetric flows) includes companies that present signals of trade in processing services associated with only one flow related to processing. For

inward processing, it means that either a flow of goods imported for processing without a subsequent flow of exports after processing or a flow of goods exported after processing without a preceding flow of imports of goods for processing exists. For outward processing, either a flow of goods exported for processing without a subsequent flow of imports after processing or a flow of goods imported after processing without a preceding flow of exports of goods for processing exists.

13. Finally, data for companies that report temporary transactions in IG in absence of IS, or processing services in IS associated to non-temporary transactions in IG, are labelled as inconsistent. In both cases it is assumed that this is due to a misreporting of NoT codes in IG.

14. When only temporary flows are observed in IG data, they are reclassified as non-temporary. In case IS transactions are only associated to non-temporary IG flows, a procedure has been set up to detect the share of IG non-temporary flows to be attributed to processing. The procedure exploits the information in the integrated database searching for compatibility at the company level between counterpart country, typology of processing service and goods traded. To give an example, if a company reports:

- an export of processing services classified under CPA code 21.20.99 *(Sub-contracted operations as part of manufacturing of pharmaceutical preparations);*

- an import of chemical products and an export of pharmaceutical products

15. and if the country of origin and destination coincides with the country of export of the processing service, then the IG flows are reclassified from non-temporary to temporary.

16. Table 1 reports, for the year 2012, imports and exports of goods, recorded in IG by NoT code, and of services, from IS. In the fifth and the sixth column of the table, the "implicit processing service" (IPS), that is the difference between the value of the good before and after processing, is reported.

Table 1
Trade in goods by NoT codes from IG and trade in services from IS. Year 2012. Millions of euro

	MFP	*MAP*	*XFP*	*XAP*	*XAP-MFP*	*MAP-XFP*	*ISX*	*ISM*
Total flows	5820	3076	2457	6198	378	619	1199	1123
A. coherence between IS and IG								
A.1 symmetric flows	4664	2626	1998	4993	329	628	368	589
A.2 asymmetric flows, of which:	366	262	259	349	-17	3	165	163
only MFP	366	0	0	0			40	0
only MAP	0	262	0	0			0	45
only XFP	0	0	259	0			0	118
only XAP	0	0	0	349			125	0
B. incoherence between IS and IG								
B.1 only IG	790	188	200	856	66	-12	0	0
B.2 only IS	0	0	0	0	0	0	666	371

IG data: MFP=imports of goods for processing; MAP=imports of goods after processing; XFP=exports of goods for processing; XAP=exports of goods after processing
IS data: ISX=exports of processing services; ISM=imports of processing services

17. For the total intra-EU flows, the IPS would be 378 million euro for inward processing (6,198 minus 5,820) and 619 for outward processing (3,076 minus 2,457), much lower than the effective value of services recorded in IS (respectively 1,199 and 1,123). However, the picture changes dramatically when data are compared by group of

observations. The value of IPS for group A.1 (consistent and symmetric observations) accounts for 329 and 628 million euro for inward and outward processing, much closer to the reported value of IS services (368 and 589 million). This is an interesting result because it shows that IPS can be used as a proxy for the processing service, once symmetric flows are detected and treated separately from asymmetric flows. On the downside a significant share of processing services in IS (666 out of 1199 million for exports and 371 out of 1123 for imports) is reported by companies that do not record transactions in IG as temporary (group B.2). In the absence of a specific source on processing services, estimates only derived from IG can therefore underestimate the phenomenon and artificially inflate gross flows of imports and exports of goods.

18.   Once the observations are assigned to the different groups, the adjustment to be applied to IG data is more straightforward. In the simplest case - i.e. coherence of observations between IS and IG and symmetric flows for processing - the temporary flows are removed from imports and exports of goods because the goods do not change ownership when crossing the border for processing (see table 2 for a summary of the adjustments).

19.   In case of asymmetric flows, since a change of property occurs, the flows are not removed but corrected, being the recorded value in IG not the one at which the good is exchanged. The adjustment will depend on the IG flow recorded.

20.   As for inward processing:

-    if only a flow of import for processing is recorded, it means that after the processing service the goods are not shipped back to the owner but sold in Italy: in this case the value of the Italian imports is estimated as the sum of the value of the raw materials and the processing fee;

-    if the signals of inward processing are combined with asymmetric flows of exports after processing, it means that the goods to be processed are not sent to Italy from abroad but purchased by the non-resident owner from another Italian firm. In this case the value of the exports is estimated by subtracting the value of the processing service from the value of the goods after processing.

21.   For outward processing the rule is reversed:

-    if an Italian company sends the goods abroad for processing and after the processing service the goods do not return to Italy but are sold in the processing country or in a third one, the value of the Italian exports is estimated as the sum of the value of the raw materials and the processing fee paid to the foreign processor;

-    if the goods to be processed are not sent to the processing country from Italy but are purchased by the Italian owner directly abroad, the value of the imports is estimated as the difference between the value of the goods after processing and the processing fee paid to the foreign processor.

22.   It is worth noting that processing may change the nature of the goods. In these cases, in the described procedure for estimating the non-observed imports and exports in presence of asymmetric flows in IG, the original CPA product codes are transformed. If, for example, an Italian company sends raw materials for processing abroad and after processing the goods are sold in the processing country to a final user, according to the new international standards the transaction to be recorded will be between the Italian company and the final user (and no more the processor), and the exports will be of manufactured goods (and no more of raw materials).

23.   Finally, if only temporary IG observations are observed, the flows are reclassified as non-temporary and, as a consequence, added to total imports and exports. When IS

transactions are associated only to non-temporary IG flows, the share of these flows reclassified as temporary, obtained as described above, is excluded from NA/BP trade in goods (in table 2 the shares are indicated as α1 and α2 for imports and β1 and β2 for exports).

IV. Estimation of goods sent abroad for processing for Extra-EU flows

24. For Extra-EU transactions, in the absence of a reliable supplementary data source, the procedure is fully based on IMTS data, with the only exception of oil refining services. In a first step NoT codes are adjusted on the basis of a cross-analysis with the custom procedures codes. Then, the temporary flows are distinguished between symmetric and asymmetric and the symmetric ones are further divided between those with a positive implicit processing service (IPS) and those with a negative IPS. For companies with a positive IPS, the following indicators are calculated:

- Mark-up of exported processing service to imports for processing $MUXS=(XAP-MFP)/MFP$

- Mark-up of imported processing service to export for processing $MUMS=(MAP-XFP)/XFP$

- Mark-down of exported processing service to exports after processing $MDXS=(XAP-MFP)/XAP$

- Mark-down of imported processing service to imports after processing $MDMS=(MAP-XFP)/MAP$

25. On the basis of the distribution of these indicators by company, geographical area and kind of service, different acceptance regions are established.

26. For all the companies reporting symmetric flows, those observations giving rise to mark-up and/or mark-down values falling outside the acceptance regions are corrected, with the correction being imputed to non-temporary flows. Consider, as an example, the case of an Italian company rendering processing services to an extra-EU owner of goods whose values reported in IMTS (Extrastat) are 100 for imports (MFP) and 85 for exports (XAP). As the implicit processing service is negative (-15), temporary imports will be corrected downwards by a factor γ, such that the mark-up of the processing service to the good to be processed (MUXS) and the mark-down of the processing service to the good processed (MDXS) will fall inside the acceptance region. With a value of γ of 0,68, the corrected value of MFP would be 68, thus resulting in a corrected IPS of 17 and values of MUXS and MDXS of 0,25 and 0,2, respectively.. The share of MFP reclassified as non-temporary imports is $(1-\gamma)MFP$.

27. In table 2 the general formulas are reported; they also include a correction factor (δ) applied to the value of the flow after processing when this value is too large with respect to the value of the flow for processing.

28. For the <u>asymmetric flows</u>, the processing service is estimated by applying the median value of the mark-up or mark-down to the reported flow and calculating final imports and exports with the same approach used for Intra-EU flows.

Table 2
Overview of the adjustments to IMTS data

Observations from IS and IMTS		*ESA 2010 and BPM6 Trade in goods and processing services*			
		Imports of goods	*Exports of goods*	*Imports of services*	*Exports of services*
INTRA-EU					
Consistency between IG and IS					
Symmetric flows	ISX, MFP, XAP	0	0	0	ISX
	ISM, XFP, MAP	0	0	ISM	0
Asymmetric flows	ISX, MFP	MFP + ISX	0	0	ISX
	ISX, XAP	0	XAP - ISX	0	ISX
	ISM, XFP	0	XFP + ISM	ISM	0
	ISM, MAP	MAP - ISM	0	ISM	0
Inconsistency between IG and IS					
Only temporary IG	MFP and/or MAP	MFP and/or MAP	0	0	0
	XFP and/or XAP	0	XFP and/or XAP	0	0
Only IS	ISX, MCO, XCO	$(1-\alpha_1)$ MCO	$(1-\beta_1)$ XCO	0	ISX
	ISM, MCO, XCO	$(1-\alpha_2)$ MCO	$(1-\beta_2)$ XCO	ISM	0
EXTRA-EU					
Symmetric flows	MFP, XAP	$(1-\gamma)$ MFP	$(1-\delta)$ XAP	0	δXAP – γMFP
	XFP, MAP	$(1-\delta)$ MAP	$(1-\gamma)$ XFP	δMAP – γXFP	0
Asymmetric flows	MFP	MFP$(1+MUXS_{med})$	0	0	MFP x MUXS$_{med}$
	XAP	0	XAP$(1-MDXS_{med})$	0	XAP x MDXS$_{med}$
	XFP	0	MFP$(1+MUMS_{med})$	MFP x MUMS$_{med}$	0
	MAP	MAP$(1-MDMS_{med})$	0	MAP x MDMS$_{med}$	0

ISX=exports of processing services; ISM=imports of processing services; MFP=imports for processing; MAP=imports after processing; MCO=imports with change of ownership; XFP=exports for processing; XAP=exports after processing; XCO=exports with change of ownership; MUXSmed = median value of MUXS; MDXSmed = median value of MDXS;

MUMSmed = median value of MUMS; MDMSmed = median value of MDMS

29. A particular treatment is defined for estimating the processing related to crude oil. This particular kind of processing is very relevant in Italy: in 2012 it accounts for more than 20% of the total export of processing services. IMTS data by NoT and by Customs procedure show some discrepancies between inflows and outflows related to the type of merchandise and to special agreements between enterprises and Customs Agency. This is due to the fact that after processing not all the refined oil leaves Italy (shipped back to the country of the owner or sent to the country of final users), but part of it remains in Italy for domestic sale (on behalf of the foreign owner). According to the new accounting standards, the imports of crude oil and the exports of refined oil reported in IMTS have to be excluded from ESA 2010 trade in goods, while the value of the refined oil that remains in Italy has to be recorded as imports of goods.

30. However, the correct registration was possible only combining IMTS data with a supplementary data source collected by the Ministry of Economic Development: the <u>quantity</u> of crude oil processed by national refineries on behalf of non-resident owners and the <u>quantity</u> of refined oil sent abroad or remaining in Italy after processing. The data on

processing fees is obtained from two different sources: business surveys, when the information is available, and Financial statements of enterprises involved in crude oil processing in the other cases.

V. Conclusions

31.   The paper describes the sources and methods used in Italy for estimating goods sent abroad for processing, according to new ESA 2010 definition based on the change of ownership principle.

32.   The methods used heavily depend on the available sources. For intra-EU flows the use of a new administrative source (Intrastat Services) combined - at the micro level - with Intrastat Goods data, overcomes the limits deriving by the lack of information on trade in goods classified by two-digits NoT codes and allows to adjust IMTS data consistently with the values of processing services flows.

33.   For extra-EU flows, with the notable exception of exports of oil refining services, IMTS data by one-digit NoT codes is the only source available. This in turn implies a wider use of statistical techniques to estimate the processing services and to adjust IMTS data in order to derive trade in goods according to new ESA definitions.

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